REMARKS

In response to the Office Action dated January 22, 2007 claims 1, 13 and 24 are amended. Claims 1-24 are now active in this application. No new matter has been added.

Claims 1-6, 8-18, and 20-24 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Tanaka (U.S. 7,116,816) in view of Bamberger (U.S. 5,946,407).

Claims 7 and 19 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Tanaka in view of Bamberger and further in view of De Gasperi (U.S. 4,433,385).

Independent claim 1 recites, in pertinent part, "an operation part for obtaining transfer characteristics to enhance difference between arbitrary pixel values among a plurality of specified pixel values which are specified in defect detection relatively to difference between arbitrary pixel values other than said plurality of specified pixel values and then obtaining an enhanced differential image between said inspection image and said reference image on the basis of said transfer characteristics, to perform an inspection on the basis of said enhanced differential image."

Similarly, independent claim 13 recites, in pertinent part, "c) obtaining transfer characteristics to enhance difference between arbitrary pixel values among a plurality of specified pixel values which are specified in defect detection relatively to difference between arbitrary pixel values other than said, plurality of specified pixel values; d) obtaining an enhanced differential image between said inspection image and said reference image on the basis of said transfer characteristics."

Also similarly, independent claim 24 recites, in pertinent part, "c) obtaining transfer characteristics to enhance difference between arbitrary pixel values among a plurality of specified pixel values which are specified in defect detection relatively to difference between

arbitrary pixel values other than said plurality of specified pixel values; d) obtaining an enhanced differential image between said inspection image and said reference image on the basis of said transfer characteristics."

In order to establish a *prima facie* obviousness under 35 U.S.C. § 103(a), all the claim limitations must be taught or suggested by the prior art. *In re Rokya*, 490 F. 2d 981, 180 USPQ 580 (CCPA 1974). Further, "rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." *In re Kahn*, 441 F. 3d 977, 988 (CA Fed. 2006). At a minimum, the cited prior art does not disclose (expressly or inherently) the above recited limitation.

The Office Action, at page 2, asserts that Tanaka, at FIG. 3 and column 6, lines 58-67, discloses an enhanced differential image.

However, Tanaka, at column 6, lines 58-67, merely states:

> In FIG. 3 is shown one example of a comparing and inspecting method, and the problem that the present invention aims at solving will be described.
>
> The image of surface pattern of the inspected object 7 shown in FIGS. 3a) and 3b) is acquired by SEM part 1. These two images are an image 21 at the inspection part in the inspecting position and a similar pattern image (reference numeral 22) stored in advance and placed near it. In FIG. 3a), the **part where brightness and a shape of the round pattern are different corresponds to a defect** 24.

Thus, Tanaka merely compares an inspection image directly with a reference image regarding brightness and shape. Tanaka does **not** obtain "**transfer characteristics** to enhance difference between arbitrary pixel values," and does **not** obtain "**an enhanced differential image** between said inspection image and said reference image on the basis of said transfer characteristics" as recited by claim 1.

As an example of claim 1, see FIG. 7 of the application, which illustrates a transfer curve 71 which is used to convert a reference image into a converted reference image, and is used to convert an inspection image into a converted inspection image. The differential absolute value between the converted reference image and the converted inspection image is the enhanced differential image. See step S17 of FIG. 5 and page 12, lines 4-10 for additional discussion.

In general, Tanaka merely discloses a structure of SEM (col. 5, lines 3-39), wherein the general control unit 12 has the function for setting an appropriate image processing condition. The non-coincidence between both images exists in the normal part and the non-coincidence includes the non-coincidence that originates in the inspected object and the non-coincidence that originates in the image detection system (col. 6, line 65 to col. 6, line 2). Causes of the non-coincidence which originates in the image detection system includes mechanical noises and noises caused by a dispersion in brightness specific to the electron image (col. 6, lines 9-19). The difference between the two images is detected as a defect (col. 7, lines 11 to 29), and setting of the threshold can be performed in an easy manner since the noise 27 is estimated in the pattern inspecting method (col. 7, lines 30-46, Fig. 3). Tanaka also estimates noises (see, col. 7, lines 62-67), and evaluates the dispersion in the process (see, col. 12, lines 1-5), and sets a threshold (see, col. 14, lines 50-52). When the comparison inspection is executed, the threshold is changed for each pixel to be processed, and the defect corresponding to the brightness of the pixel is discriminated (col. 14, lines 50-65). After that, the method of monitoring the state of the device (col. 15, lines 54-56) and an example of method for setting the threshold (col., 16, lines 33-35) and so on are disclosed.

Additionally, the Office Action, at page 3, asserts that Bamberger, at FIG. 6C-E and column 13, lines 14-21, discloses using transfer characteristics to enhance a difference.

However, Bamberger, at column 13, lines 13-33 merely states:

> If however all possible reductions have been made, the input pair table is complete and the system goes to step 424 to make a look up table. **FIG. 6E illustrates a look up table 462 which is a step function. The input of the look up table is the grey levels of the digital image of a region of interest and the output is the converted grey levels creating an enhanced image.** In order to derive the incremental steps 460 along the i' axis of the table, the system counts the number of the pairs in the input pair table and divides 255 by the number of the pairs to get a value "dl." For the intervals defined by each pair, the table converts the grey level values within that interval into new values, which are linearly distributed within the increment "dl" along the i' axis. Grey level values between two pairs are converted into a fixed value. FIG. 6E illustrates an example of the intervals 464, 466, 468, 470 and 472, within which grey level conversions occur. As can be seen, a large grey level difference between a pixel and its neighboring pixels as illustrated by pair 470 is diminished and a small grey level difference between a pixel and its neighboring pixel as illustrated by pair 466 is accentuated. Remarkably, **the overall result is an image with an improved contrast**.

Bamberger merely uses a step function to discretize grey values of a single image based on a value "dl." See FIG. 6E. This makes it possible to diminish a large grey level difference between a pixel and its neighboring pixels and accentuate a small grey level difference between a pixel and its neighboring pixel (col. 13, lines 28-32). Further, Bamberger merely applies this step function to single image, so that "the overall result is an image with an improved contrast," as stated above.

Hence, Bamberger does **not** obtain **"transfer characteristics** to enhance difference between arbitrary pixel values," and does **not** obtain **"an enhanced differential image** between said inspection image and said reference image on the basis of said transfer characteristics" as recited by claim 1.

In general, Bamberger relates to a system for the detection and diagnosis of diseases of living tissues, in particular, breast cancer (col. 3, lines 64-66), and the system yields a converted digital image by enhancing the original digital image (col. 4, lines 19-20 and lines 32-34). In this

process, grey scale conversion curve 350 shown in Figs. 3B through 3D is used (col. 7, lines 54-56). Next, the system modifies differences between each pixel and its neighboring pixels so that large grey level differences are diminished and small grey level differences are accentuated. In modifying process, averaging each pixel with weighted sum of grey level values of neighboring pixels is performed (col. 11, lines 62-66), and the system creates a contrast table p(fi, gi) where fi is the grey level value of pixels in the original digital image and gi is the grey level value of the corresponding pixel in the convoluted region of interest (CROI) (col. 12, lines 24-28), and a look up table is created by using the contrast table p (col. 12, lines 31-32). In creating the contrast table, the system determines whether there is an overlap between a pair of (f, g) and the next pair of (f, g) and when the pairs are overlapping, a new reduced pair is created (cot. 12, lines 31-51). By performing the operation on all of the pairs of (f, g), input pair table is created (col. 13, lines 13-14). After that, the system counts the number of the pairs in the input pair table and divides 255 by the number to get a value "dl" of Fig. 6E and a look up table is obtained. The look up table converts the grey level values within the interval defined by each pair into new values, which are linearly distributed within the increment "dl" along the i' axis, and the grey level values between two pairs are converted into a fixed value (col. 13, 19-26). This makes it possible to diminish a large grey level difference between a pixel and its neighboring pixels and accentuate a small grey level difference between a pixel and its neighboring pixel (col. 13, lines 28-32). Bamberger also discloses the process of identifying and quantifying microcalcifications (see, col. 15, lines 39-40) and visualization and quantification (see, col. 23, line 35).

Thus, Applicant submits that independent claim 1 is patentable over Tanaka and Bamberger.

The other cited art (De Gasperi) does not remedy the deficiencies of the combination of Tanaka and Bamberger. De Gasperi merely discloses an apparatus for real time detection and signaling of faults in objects or industrial products (col. 1., lines 6-9). The calculating device 7 is programmed to read the dots of the stored image, of square matrixes of different sizes (col. 5, lines 15-17), and the arithmetic unit 8 calculates the standard deviation of the luminance values of the dots (col. 5, lines 24-26) and then compares the σ values between the sample and the object to be checked (col. 5, lines 34-35). This makes it possible to perform inspection without the influence of illumination (col. 1, lines 40), noise (col. 1, lines 57 and 63).

Further, Applicant submits that independent claims 13 and 24 are patentable for reasons similar to independent claim 1.

Under Federal Circuit guidelines, a dependent claim is nonobvious if the independent claim upon which it depends is allowable because all the limitations of the independent claim are contained in the dependent claims, *Hartness International Inc. v. Simplimatic Engineering Co.*, 819 F.2d at 1100, 1108 (Fed. Cir. 1987). Accordingly, as independent claims 1 and 13 are patentable for the reasons set forth above, it is respectfully submitted that all claims dependent thereon are also patentable.

Thus, it is respectfully submitted that dependent claims 2-12, and 14-23 are also patentable for the same reasons as their respective base claims.

Accordingly, it is urged that the application, as now amended, is in condition for allowance, an indication of which is respectfully solicited. If there are any outstanding issues that might be resolved by an interview or an Examiner's amendment, Examiner is requested to call Applicants' attorney at the telephone number shown below.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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